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STEAM TURBINES AND MORE PARTICULARLY TO A DISC THEREFOR, PROVIDED AT BOTH SIDES WITH BLADES
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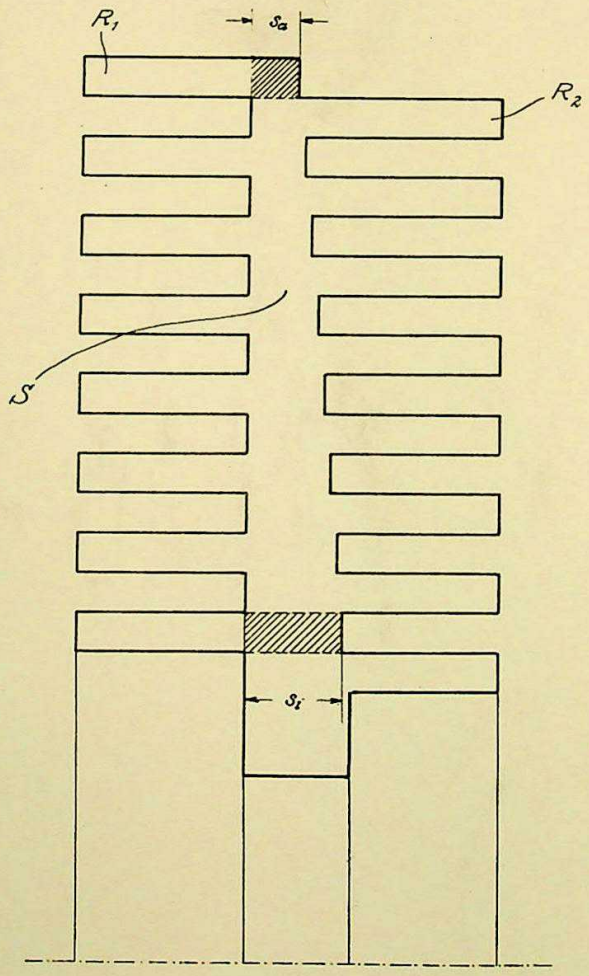


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# ALIEN PROPERTY CUSTODIAN

## STEAM TURBINES AND MORE PARTICULARLY TO A DISC THEREFOR, PROVIDED AT BOTH SIDES WITH BLADES

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This invention relates to steam turbines and more particularly to a disc therefor, provided at both sides with blades.

Steam turbines with radial admission of the working fluid, i. e. a particular type of centrifugal machines have been already proposed in which the blade rims are arranged on a disc provided with blades at one side thereof and which has such a thickness as to behave as a substantially rigid body with respect to the shearing stresses to which the disc is subjected. Also an elastic disc of a very small thickness resistant to shearing and which may be provided at one or both sides with blades is well known in the art. In the case of a blading at both sides of the disc, webs which deform approximately in the form of an S as a result of the shearing forces acting thereon are provided between the blade rings disposed at both sides of the disc, irrespective of whether the blade rings are arranged in staggered relation or not. The deformation may, however, be considerably reduced by arranging the blade rings disposed at both sides of the disc in stepped relation in such a manner that the outer diameter of the ring at one side is equal to the inner diameter of the following ring of the other side. In this manner the webs are eliminated and the disc becomes more rigid.

The essence of the present invention consists in the fact that the staggered blade rings overlap one another an amount which is the greater, the higher the stress will be. In this manner a disc is obtained whose cross-section has substantially the form of a cone.

In order that the invention may be more readily understood, one embodiment thereof will now be described with reference to the accompanying drawing.

The blade rings $R_1$ arranged on the one side and the blade rings $R_2$ on the other side are machined from the material of the disc S. The disc to which the working fluid is admitted at both sides thereof is naturally stressed to a greater extent at root than at the outer periphery. In order to take this fact into consideration the disc is designed according to the invention in the following manner: The blade ring $R_1$ and the blade ring $R_2$ overlap each other by an amount $s_a$. This amount of overlap is not constant throughout the entire diameter of the disc but increases with increasing stress, so that the greatest stress is taken up by the overlap $s_1$. In this manner a new disc type is obtained which is neither a rigid disc nor an elastic disc resistant to shearing.

The amount by which the overlap is to be increased is a matter to be judged by the designer in accordance with the permissible values of the strength of the material under consideration.

ERNST GENTE.